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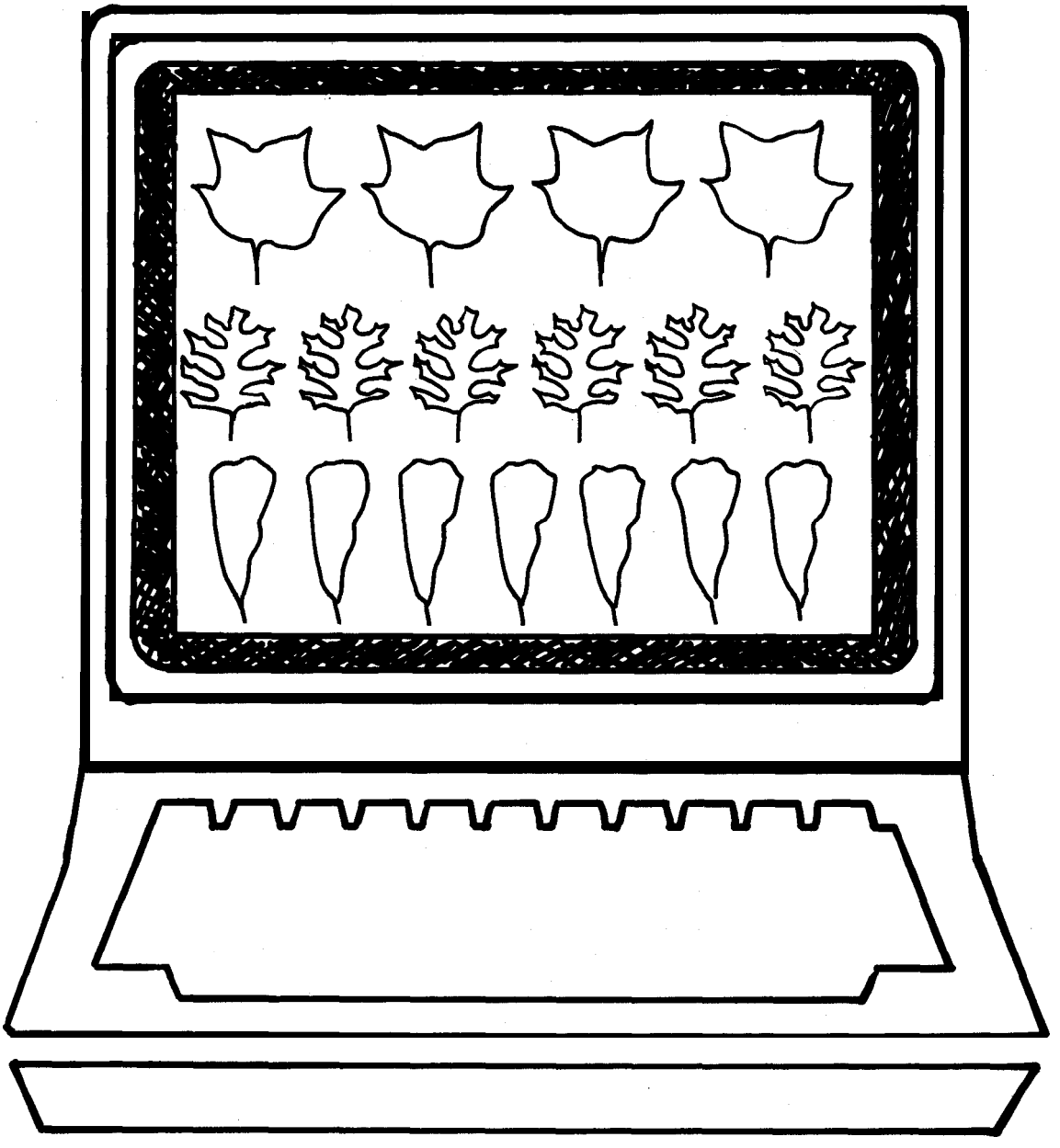
SITEQUAL—A User's Guide

Computerized Site Evaluation for 14 Southern Hardwood Species

Constance A. Harrington and Bettina M. Casson



SUMMARY

An interactive computer program, SITEQUAL, has been developed from the widely-used Baker and Broadfoot field guides, which evaluate site quality for 14 southern hardwood tree species. The **SITEQUAL** program calculates site index for all species simultaneously and provides a breakdown of site index into the component contributions by each of the four major soil factors defined by Baker and Broadfoot. When the necessary soil-site information is available, **SITEQUAL** can be used to rapidly evaluate a series of site conditions for all species or to determine the relative sensitivity of these species to specific conditions including past or proposed land use practices.

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INTRODUCTION

In the late 1970'8, James B. Baker and Walter M. Broadfoot of the Southern Forest Experiment Station published field guide8 for evaluating site quality for the commercially important hardwood specie8 in the Southern United State8 (Baker and Broadfoot 1977, 1979). These field guide8 enable the user to evaluate the four major soil factor8 of physical condition, moisture availability, nutrient availability, and aeration, and then to calculate site index for any of the following 14 hardwood tree species: cottonwood (*Populus deltoides*), green ash (*Fmxinus pennsylvanica*), pecan (*Carya illinoensis*), sycamore (*Platanus occidentalis*), sweetgum (*Liquidambar styraciflua*), yellow poplar (*Liriodendron tulipifem*), hackberry (*Celtis occidentalis*), sugarberry (*C. Zaevigata*), cherrybark oak (*Quercus falcata* var. *pagodifolia*), Nuttall oak (*Q. nuttallii*), Shumard oak (*Q. shumardii*), water oak (*Q. nigm*), willow oak (*Q. phellos*), and swamp chestnut oak (*Q. michauxii*). The field guide8 require the user to answer a series of question8 which quantify the soil and site condition8 of the area being evaluated. Information is required on: soil depth, texture, structure, and compaction; presence of a pan; past use and present vegetative cover; topographic position including depth to water table, swampiness, length of flooding, and microrelief; soil age and geologic source of the parent material; pH, organic matter; and soil color. The questions are presented in a modified multiple-choice format with each species evaluated in separate site evaluation tables.

This report describes the use of an interactive computer program, SITEQUAL, which was developed from the Baker-Broadfoot field guides. SITEQUAL predicts site index for all 14 hardwood species at the same time. The program require8 the same user-supplied information a8 the published site evaluation table8 and there are no difference8 in the site index[1] predicted for any species between the program and the Baker-Broadfoot field guides. SITEQUAL doe8 differ from the Baker-Broadfoot field guides in the order and format in which questions are asked, these difference8 in organization allow all species to be evaluated simultaneously and reduce the overlap between questions. Several versions of the program are available for different type8 and model8 of computers.

The major advantage8 of using the SITEQUAL program are completeness and speed. In the past, users of the Baker-Broadfoot field guide8 would commonly evaluate only 3 or 4 hardwood species for a site rather than all of the 14 possible species. This partial evaluation ran the risk of overlooking species that might be more productive than the species evaluated. In addition, the speed at which different sets of site condition8 can be evaluated make8 the SITEQUAL program more efficient to use than the field guides, especially when a user ha8 the necessary soil-site data already "in hand" for several areas.

cautions

The SITEQUAL program only evaluates the site condition8 used a8 input data, and all 14 hardwood species will be evaluated for a site, regardless of whether or not all species naturally occur on a particular soil. In addition, the broad geographic area of applicability for the program is the same as that specified in the field guides, i.e., "the southern hard-

[1] In the Baker-Broadfoot field guides the phrase "site quality rateing" was used to refer to potential or calculated site index. In this report, the more commonly used phrase, site index, is used in place of site quality rating.

Constance A. Harrington is research forester and Bettina M. Casson is computer programmer, Forestry Sciences Laboratory, Southern Forest Experiment Station, USDA Forest Service, in cooperation with the Department of Forest Resources and Arkansas Agricultural Experiment Station, University of Arkansan at Monticello.

wood region except in those mountainous areas where aspect is important" (Baker and Broadfoot 1979, p 2). Neither the program nor the field guides should be used without modification outside this region unless local testing indicates their applicability.

It is highly recommended that potential users of SITEQUAL read the Baker-Broadfoot field guides before using the program. The field guides illustrate how the site index values are calculated and contain useful background information on assessing soil and site properties.

PROGRAM SITEQUAL

Organization

The SITEQUAL program consists of 12 major program segments with each segment containing the calculations for 1 or 2 species. Hackberry and sugarberry are evaluated in one program segment, water oak and willow oak are evaluated together in another program segment, and the other 10 species are evaluated individually. The first program segment is for cottonwood, in addition to calculating site index for cottonwood, this segment also contains all of the questions, and accepts the answers for all of the other species. The answers given in the first program segment are checked to see if they are within acceptable ranges for thatquestion. If an answer is not acceptable the question is repeated. If answers given in the first program segment are acceptable, they are automatically passed to the next 11 program segments for calculation of the site index values for the other species. The program logic is flowcharted in Appendix C.

Site index (SI) is calculated by summing the values obtained in each of four major soil factors: (1) Physical condition; (2) Moisture availability during the growing season; (3) Nutrient availability; and (4) Aeration. SITEQUAL calculates a factor value by summing the values assigned to the individual soil-site properties. The percentage of the maximum allowable value is also determined for each factor and species combination. Several individual soil-site conditions were considered by Baker and Broadfoot to indicate the site was unsuitable for a species. Those site conditions, given in table 1, result in the species being assigned an unsuitable rating in the output with a footnote indicating the reason for the rating (see examples in Appendix A). The computed SI value is also compared to the minimum acceptable value established by Baker and Broadfoot for each species (table 1). A footnote in the output table indicates if the calculated value is below the minimum acceptable value.

Questions and Answers

The SITEQUAL program requires information on various soil and site characteristics (table 2). Most answers can be selected from a multiple choice format. The user needs to press only one number key and then the <RETURN> or <ENTER> key. A site identification in the form of a number or name is required; any combination of letters, numbers, spaces, or special characters can be used, up to a maximum of 17 characters or spaces. Values for pH can be input as either whole numbers (e.g. 5) or with decimal fractions (e.g. 4.5). All other questions require a single digit response. Out of range answers result in the question being asked again.

Table 1.—*Summary of minimum site index values and unsuitable soil-site conditions which result in comment footnotes in the program output*

Tree species	Minimum SI[1] considered acceptable for management	Condition resulting in unsuitable ratings and footnoted by program			
		Water table <1 foot	Water-logging	pH>7.5	Flooding continuous
	--- *Feet* ---				
Cottonwood	80	x	x		x
Green Ash	65		x		
Hackberry, Sugarberry	55	x	x		x
Cherrybark Oak	70	x	x	x	x
Nuttall Oak	75	x	x	x	x
Shumard Oak	70	x	x	x	x
Swamp Chestnut Oak	65	x	x	x	x
Water Oak, Willow Oak	70	x	x	x	x
Pecan	70	x	x		x
Sweetgum	75	x	x		x
Sycamore	70	x	x		x
Yellow Poplar	70	x	x		x

[1]SI is site index at age 30 for cottonwood, age 50 for other species.

Table *S.-Listing of SITEQUAL questions and possible answers. Questions preceded by a * are only asked if the user's response to a previous question triggers the pmgmm to ask for additional information.*

This program predicts site index for 14 southern hardwood species. It requires the user to answer questions on soil properties and site characteristics for each area that is evaluated. The questions are answered by pressing the appropriate key or keys (most answers are a l-digit number) followed by pressing the <RETURN> key.

Do you wish to run this program?
(1) Yes
(2) *No*

Input Site number or name

Input presence of artificial or inherent pan from the following list:
(1) Without pan
(2) Plowpan
(3) Inherent pan

*Input depth of soil that can be readily occupied by roots from the following list:
(1) Deep soil; >4 feet
(2) Medium soil; 2-4 feet
(3) Shallow soil; <2 feet

Does the soil contain any stratified horizons within the effective rooting zone?
(1) Yes, major horizons are stratified
(2) No, major horizons are not stratified

Input the structure in rooting zone from the following list:
(1) Granular
(2) Massive (if silty, loamy, or mucky)
(3) Massive (if clayey)
(4) Single grained (if sandy)
(5) Prismatic
(6) Platy
(7) Blocky

*Input the soil texture in rooting zone from the following list:
(1) Fine-textured, clayey
(2) Medium-textured; silty or loamy
(3) Coarse-textured; sandy

Classify compaction in the surface foot from the following list:
(1) No compaction; loose, porous, friable; (bulk density <1.4 g/cc)
(2) Moderately compacted, firm, moderately tight; (bulk density 1.4-1.7 g/cc)
(3) Strongly compacted; tight; (bulk density >1.7 g/cc)

Input present cover from the following list:
(1) Forest cover (includes sites recently clearcut)
(2) Open with grass cover
(3) Open and bare

*How many years has this site been cultivated or pastured?
(1) 0 (i.e. never cleared for cultivation or pasture)
(2) l-4 years
(3) 5-9 years
(4) 10–19 years
(5) 20 years or more

*Did past farming cultural practices include annual fertilization?
(1) Yes
(2) No

Input average depth to water table during the growing season from the following list:
(1) <1 foot
(2) l-2 feet
(3) 2-6 feet
(4) 7-10 feet
(5) >10 feet

Table 2.-*Listing of SITEQUAL questions and possible answers. Questions preceded by a * are only asked if the user's response to a previous question triggers the progmm to ask for additional information.—Continued*

Input the topographic position from the following list:
(1) Floodplain or stream bottom
(2) Stream terraces or lower slopes
(3) Upland

Input the microsite from the following list:
(1) Concave; depression, pocket, trough
(2) Level; flat
(3) Convex; ridge, mound

Input flooding times from the following list:
(1) Winter through spring
(2) Winter only
(3) None
(4) Continuous

Input the geologic source from the following list:
(1) Mississippi River, Loess, Blackland
(2) Mixed Coastal Plain and other
(3) Coastal Plain

Input the organic matter in A-horizon from the following list:
(1) Organic matter >2%
(2) Organic matter ≥1% or Organic matter 52%
(3) Organic matter <1%

Input depth of topsoil (A-horizon) from the following list:
(1) >6 inches or no profile development
(2) 3-6 inches
(3) <3 inches

Input soil age from the following list:
(1) Young; no profile development (Entisols)
(2) Medium; moderate profile development (Inceptisols)
(3) Old; well-developed profile, leached (Altisols, Ultisols)

Input pH in rooting zone. EX. 5.5

Input swampiness from the following list:
(1) Wet in winter only
(2) Wet January-July
(3) Waterlogged all year

Input mottling from the following list:
(1) None to 18 inch depth
(2) None to 8 inch depth
(3) Mottled to surface or gray mineral soil

Input soil color in rooting zone from the following list:
(1) Black, brown, red
(2) Yellow, brownish-gray
(3) Gray

Do you want a listing of your input values.
(1) Yes, please provide a listing
(2) No, input listing is not necessary

Do you want to do another set of site evaluations?
(1) Yes
(2) No

Options

The program provides the user with three choices or options. When SITEQUAL begins, it presents an introductory paragraph and asks the user whether he or she wishes to run the program (table 2). If the user presses 1 (meaning Yes, followed by pressing <RETURN>), the program continues by asking the user to "Input site number or name". If the user presses 2 (meaning No, followed by pressing <RETURN>), the program goes to the END statement and stops. Thus, the first option provides the user a chance to exit the program gracefully (i.e. without "crashing").

The other two choices offered the user occur at the end of the program-user dialog. The user is first asked, "Do you want a listing of your input values?" If the question is answered affirmatively (by pressing 1 and then <RETURN>), a list of the input values for each soil-site property will be printed above the basic summary table (see table 3). The input values listed correspond to the categories selected by the user. For example the "1" printed to the right of "Presence of pan" in table 3 corresponds to the category "(1) Without pan" in the listing of the SITEQUAL questions (table 2). If the question on input values is answered negatively, only the basic summary table is provided. Immediately after answering this question, the output will begin printing (see discussion under "Versions of SITEQUAL" for systems without a printer>. Following the printing of the output, the program will ask, "Do you want to do another set of site evaluations?" If the answer is Yes (i.e., 1 was pressed), the program will loop back to the beginning and restart. If No is selected (i.e., 2 is pressed), the program goes to the END statement and stops.

EXAMPLES AND USES

The output available from a run of SITEQUAL is illustrated in table 3. It is composed of a title, site identification, optional listing of input values, and summary table. For all 14 hardwood species the program calculates the number of points assigned in each of the four soil factors and the total site index. In addition, the calculated value for each factor is di-

Table 3.-*Example of output obtained using SITEQUAL program and selecting the option to print the input values. SI is site index in feet at 30 years for cottonwood and 60 years for the other species*

SITEQUAL-Site Evaluation for 14 southern hardwoods.

Site ID Example 1

Input values for each soil site property.

Presense of pan	1	Soil depth	1
Stratification	1		
Soil structure	1	Soil texture	2
Compaction	1	Present cover	1
Water table depth	4	Topographic position	1
Microsite	2	Flooding times	1
Geologic source	1	Organic matter	1
Topsoil depth	1	Soil age	1
pH	7	Swampiness	1
Mottling	1	Soil color	1

Species	Number of points and % of total possible by factor'				Total SI
	Physical condition	Moisture avail.	Nutrient avail.	Aeration	
Cottonwood	46(100%)	41(89%)	26(100%)	12(100%)	125
Green Ash	21(100%)	40(85%)	26(100%)	10(100%)	97
Hackberry, Sugarberry	25(100%)	22(88%)	25(100%)	25(100%)	97
Cherrybark Oak	31(100%)	34(89%)	23(92%)	31(100%)	119
NuttallOak	24(100%)	31(74%)	28(93%)	24(100%)	107
Shumard Oak	31(100%)	28(88%)	27(93%)	30(100%)	116
Swamp Chestnut Oak	28(100%)	29(94%)	22(92%)	26(100%)	105
Water Oak, Willow Oak	29(100%)	30(88%)	21(91%)	29(100%)	109
Pecan	27(100%)	27(90%)	30(100%)	28(100%)	112
Sweetgum	30(100%)	32(89%)	24(100%)	30(100%)	116
sycamore	32(100%)	16(80%)	39(100%)	39(100%)	126
Yellow Poplar	40(100%)	27(90%)	25(100%)	30(100%)	122

vided by the maximum number possible and the resulting percentage is printed. This calculation enables the user to readily identify which of the four major soil factors is at the least optimum level. In the example given in table 3, two of the soil factors evaluated for Nuttall oak have similar values-Moisture Availability (31) and Nutrient Availability (28). In the model developed by Baker and Broadfoot, however, moisture availability during the growing season was considered to be more important than nutrient availability in determining site quality for Nuttall oak; thus, the percentage of total points possible differs between the two soil factors (74 percent versus 93 percent). The soil factor achieving the lowest percentage-moisture availability in the above example-was considered by Baker and Broadfoot as the factor that was most limiting to tree growth on that site.

Another possible use of the SITEQUAL program is to evaluate the relative sensitivity of these hardwood tree species to past land use practices (e.g., agricultural cropping) or proposed future practices (e.g., construction of a drainage system). For example, the values in table 4 were determined by using the same basic soil characteristics as in table 3, but in the second case the site had been cropped for 30 years rather than having been under tree cover. For this scenario it was assumed that 30 years of cropping had caused development of a plow pan and moderate compaction in the surface foot of soil but that little topsoil had been lost due to erosion. Predicted site index was lower for all species (after cropping), but the magnitude of the reduction varied by species. Cottonwood was the species most sensitive to the site changes associated with cropping, losing a total of 36 feet of potential site index (125 minus 89). Pecan was the least sensitive, losing 23 feet of site index.

VERSIONS OF SITEQUAL

Similarities and Differences

SITEQUAL was written in the BASIC computer language; unfortunately since a standardized version of BASIC does not exist, several versions of the program needed to be created so the program could be run on different types and models of computers (table 5).

Table 4.—*Example of SITEQUAL output. Soil and site conditions in this example are the same as in table 3 except for example 2 it was assumed the site had been cultivated for* 30 years. *As a result of cultivation, a plow pan and moderate compaction developed and organic matter content was decreased.*

SITEQUAL-Site Evaluation for 14 southern hardwoods.

Site ID Example 2

Input values for each soil site property.

Presenseofpan	2		
Stratification	1		
Soil structure	1	Soil texture	2
Compaction	2	Present cover	3
Past use	6	Fertilization	2
Water table depth	4	Topographic position	1
Microsite	2	Flooding times	1
Geologic source	1	Organic matter	3
Topsoil depth	1	Soil age	1
pH	7	Swampiness	1
Mottling	1	Soil color	1

Species	Number of points and % of total possible by factor				Total SI
	Physical condition	Moisture avail.	Nutrient avail.	Aeration	
Cottonwood	31(67%)	35(76%)	11(42%)	12(100%)	89
Green Ash	13(62%)	34(72%)	14(54%)	10(100%)	71
Hackberry,Sugarberry	16(64%)	17(68%)	15(60%)	25(100%)	73
Cherrybark Oak	20(65%)	29(76%)	14(56%)	31(100%)	94
Nuttall Oak	14(58%)	24(57%)	16(53%)	24(100%)	78
ShumardOak	20(65%)	23(72%)	18(62%)	30(100%)	91
Swamp Chestnut Oak	17(61%)	22(71%)	14(58%)	26(100%)	79
Water Oak, Willow Oak	19(66%)	25(74%)	13(57%)	29(100%)	86
Pecan	17(63%)	22(73%)	21(70%)	28(100%)	88
Sweetgum	20(67%)	27(75%)	14(58%)	30(100%)	91
sycamore	20(63%)	11(55%)	25(64%)	39(100%)	95
Yellow Poplar	26(65%)	21(70%)	16(64%)	30(100%)	93

Table 5.—*Summary of SITEQUAL versions*

Language of version	Tested on these machines	Special comments
HP BASIC	Hewlett Packard 9845	When doing repeated, sets of site evaluations, user can press <CONT> key for values that do not change between sites.
AppleSoft™ BASIC	Apple IIc, IIe	Both 40-and 80-column versions are available.
MicroSoft™ BASIC	IBM-PC, North Star Advantage, Cromemco, Panasonic S- Partner, Compaq D G Dasher One	North Star version reloads program for subsequent runs, other MicroSoft™ versions go to question asking for site ID.
BASIC-11	DEC-PDP-11/23	Program creates output file; user must send output file to printer.

All versions of the program give identical answers. We have only run the program on the computer models listed in the table; however, virtually any machine that runs MicroSoft™ BASIC should run the MicroSoft™ BASIC interpreted version of SITEQUAL without changes. Although the language version of the program may be the same for many machines, the user must make sure he or she uses the right type of diskette, data cartridge, or tape and that it has been correctly formatted for his or her system.

The AppleSoft™ BASIC and BASIC-11 versions of the program differ from the other two major versions in that they do not utilize any IF/THEN/ELSE statements, and variable names are limited to two characters (Appendix B). Other machines with similar requirements for their type of BASIC may be able to run one of these program versions with little or no modification.

All versions of SITEQUAL except the BASIC-11 version automatically route the program output to the printer port. If a "printer version" of the program is run on a machine which is not connected to a printer, the output phase of the program will result in an error message or will cause the machine to "freeze". If the user wishes to run the program but does not have access to a printer, all LPRINT statements in the program (for the printer) must be changed to PRINT statements (for the screen).

With the Hewlett Packard Interpreter all soil-site variable values and all question values are retained in memory. Thus, when evaluating more than one site, the values from the first evaluation can be input for the second evaluation by pressing <CONT>. This allows the user to change the value of any variable that is different, but eliminates the need to re-input values that are the same as were used in the evaluation of the previous site. On most other systems each time a site is evaluated the program is loaded back in memory, a process which erases any soil-site variable values or question values that were used previously. The user must supply a new value for each question every time a new site is evaluated.

The AppleSoft™ version of SITEQUAL is available in both 40 column and 80 column subversions. The versions are almost identical except for formatting. However, if the 80 column version is run on a machine that does not contain an 80 column card, the program will be scrambled. After initially turning on the 80 column card, it is not necessary to repeat the process, as the program does it automatically after each site evaluation table is printed.

Availability

A program listing,. program documentation, or copies of the SITEQUAL program may be obtained by contacting the authors at the Southern Forest Experiment Station, Box 3516, Monticello, AR 71655, 501-367-3464. Requests by mail should include a name, address, and phone number as well as a blank diskette, data cartidge, or tape which is compatible with the version being requested. If a MicroSoft™ BASIC version is desired, please indicate whether a compiled or an interpreted program is needed. An interpreted program can be changed by the user; however, in order to actually run an interpreted program, the user must have a BASIC interpreter software program that is compatable with the user's system. Compiled programs can be run without additional software but cannot be altered.

LITERATURE CITED

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APPENDIX A

Examples of Special Cases

The following two examples illustrate the footnotes that appear when the site quality rating is below the minimum acceptable value established for a species (example 3) or when a specific soil-site property makes the site unsuitable for a species (example 4).

Example 3

Species	Number of points and % of total possible by factor				Total SI
	Physical condition	Moisture avail.	Nutrient avail.	Aeration	
Cottonwood	11(24%)	7(15%)	26(100%)	11(92%)	55@
Green Ash	6(29%)	22(47%)	26(100%)	9(90%)	63@
Hackberry, Sugarberry	11(44%)	11(44%)	25(100%)	23(92%)	70
Cherrybark Oak	15(48%)	14(37%)	23(92%)	27(87%)	79
Nuttall Oak	9(38%)	19(45%)	28(93%)	22(92%)	78
Shumard Oak	15(48%)	15(47%)	27(93%)	26(87%)	83
Swamp Chestnut Oak	12(43%)	14(45%)	22(92%)	24(92%)	72
Water Oak, Willow Oak	14(48%)	13(38%)	21(91%)	27(93%)	75
Pecan	14(52%)	15(50%)	30(100%)	25(89%)	84
Sweetgum	15(50%)	12(33%)	24(100%)	26(87%)	77
Sycamore	9(28%)	1(5%)	39(100%)	36(92%)	85
Yellow Poplar	13(33%)	16(53%)	25(100%)	24(80%)	78

@Total SI is below minimum site index considered reasonable for planting or managing this species unless soil conditions can be improved.

site ID Example 4

Species	Number of points and % of total possible by factor				Total SI
	Physical condition	Moisture avail.	Nutrient avail.	Aeration	
Cottonwood	22(48%)	40(87%)	17(65%)	11(92%)	90
Green Ash	14(67%)	42(89%)	18(69%)	9(90%)	83
Hackberry, Sugarberry	15(60%)	21(84%)	21(84%)	23(92%)	80
Cherrybark Oak	.....	.....	.....*	.....	Unsuitable
Nuttall Oak	.....	.....	.....	.....	Unsuitable
Shumard Oak	.....	.....	.....*	.....	Unsuitable
Swamp Chestnut Oak	.....	.....	.....*	.....	Unsuitable
Water Oak, Willow Oak	.....	.....	.....*	.....	Unsuitable
Pecan	16(59%)	26(87%)	26(87%)	25(89%)	93
swsetgum	21(70%)	31(86%)	19(79%)	30(100%)	101
sycamore	19(59%)	15(75%)	30(77%)	36(92%)	100
Yellow Poplar	20(50%)	25(83%)	18(72%)	24(80%)	87

*Site is classified unsuitable for this species because pH is above 7.5.

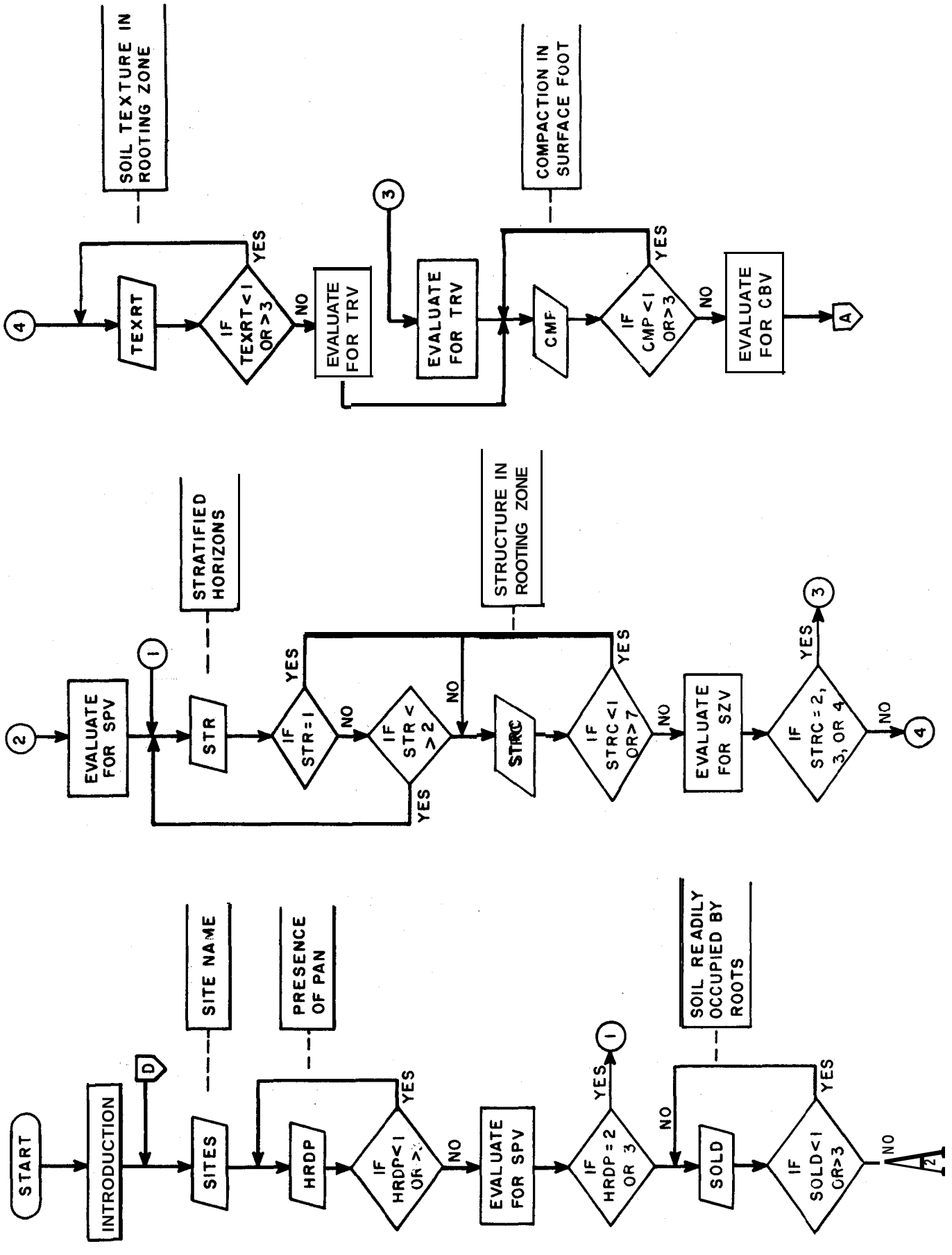
APPENDIX B

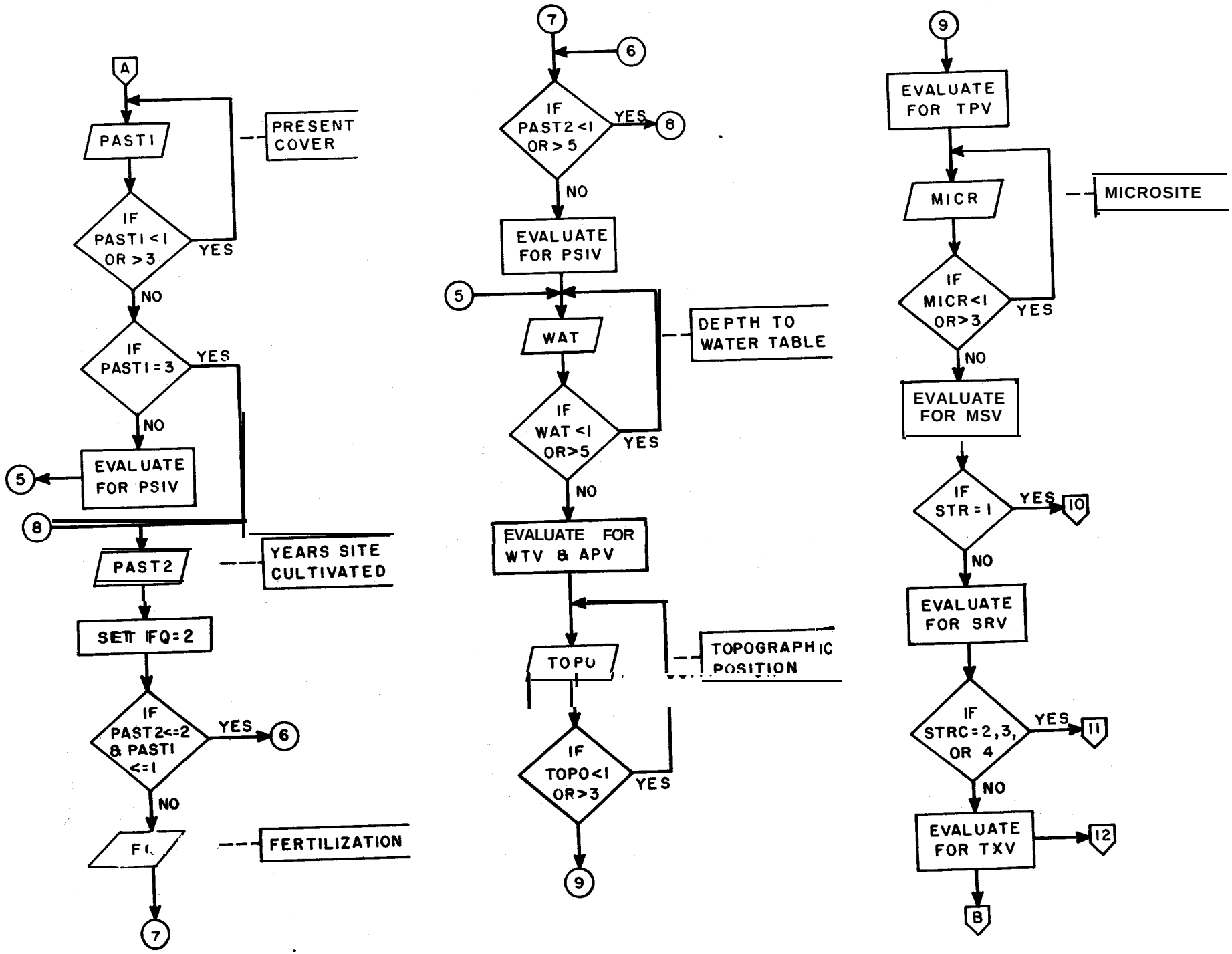
Soil-site and factor variable names by program version

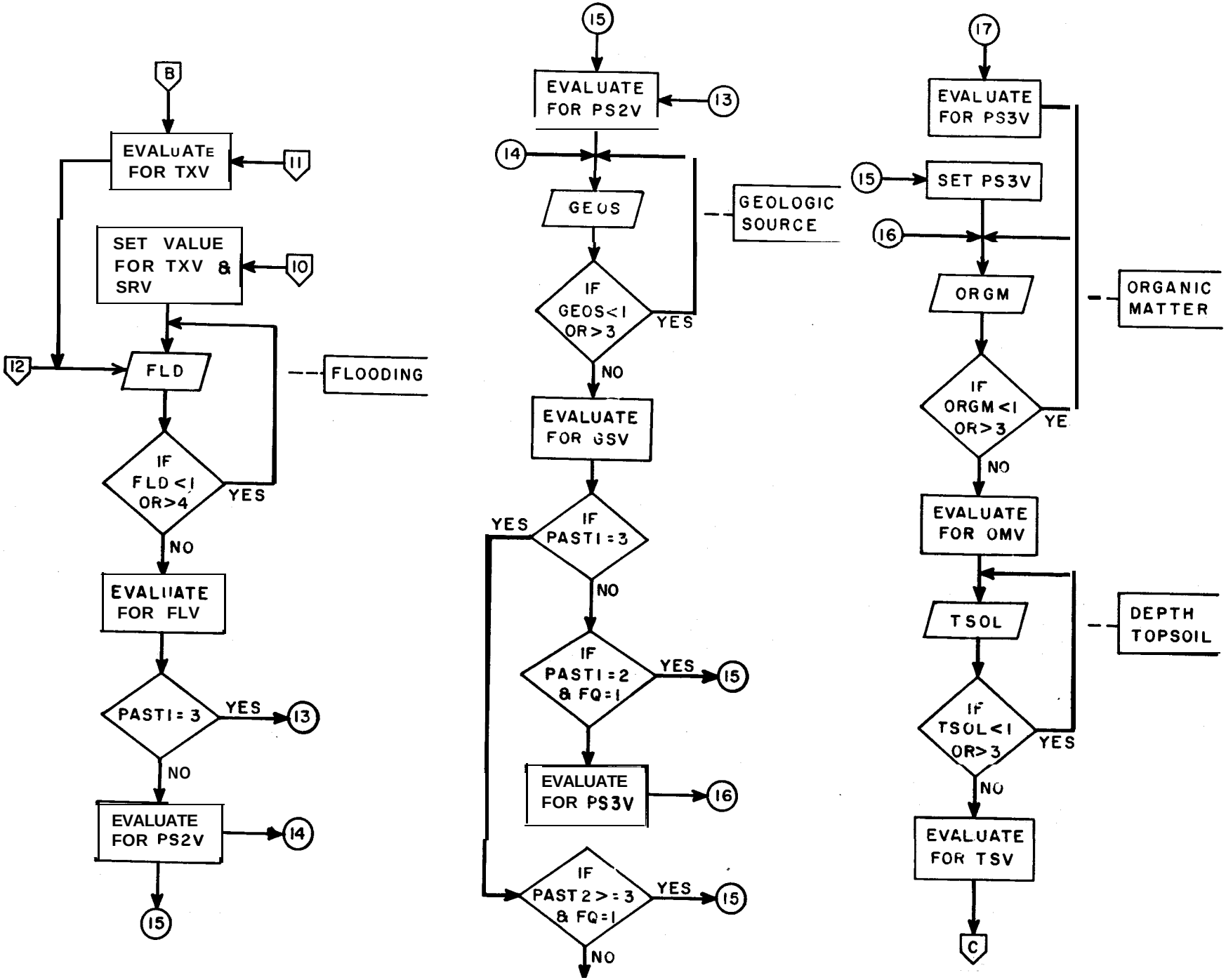
Soil-site variables			Factor variables	
MicroSoft version	**All** other versions	Conditions being quantified	**MicroSoft** version	All other versions
Factor 1. Physical condition				
HRDP	**H1**	**Hardpan**	**SPV**	**S9**
SOLD	**S3**	Soil Depth	**SPV**	**S9**
STRC	**S5**	Soil Structure	szv	**Z9**
TEXRT	**T1**	Texture (Rooting Zone)	TRV	**T9**
CMP	C1	Compaction	CBV	**C9**
PAST1	**P1**	Present Cover	**PS1V**	**P9**
PAST2	P2	Cultivation	**PS1V**	**P9**
Factor 2. Moisture availability during the growing season				
WAT	**W1**	Water Table Depth	**WTV**	**W9**
HRDP	**H1**	**Hardpan**	APV	A9
TOP0	**T2**	Topographic Position	TPV	**T8**
MICR	M1	Microsite	MSV	**M9**
STRC	**S5**	Soil Structure	SRV	**R9**
STR	**S4**	Stratification	SRV	**R9**
TEXRT	**T1**	Texture (Rooting zone)	TXV	T7
FLD	F7	Flooding	FLV	**F9**
PAST1	**P1**	Present Cover	**PS2V**	**P8**
PAST2	P2	Cultivation	**PS2V**	**P8**
Factor 3. Nutrient availability				
GEOS	C1	Geologic Source	GSV	**G9**
PAST1	**P1**	Present Cover	**PS3V**	P6
PAST2	**P2**	Cultivation	**PS3V**	P6
FQ	**F6**	Fertilization	**PS3V**	P6
ORGM	01	Organic Matter	OMV	09
TSOL	T3	Topsoil	TSV	T6
SOLA	**S1**	Soil Age	SAV	A8
PH	**P3**	**pH**	PI-IV	P7
Factor 4. Aeration				
STRC	**S5**	**Soil Structure**	**SZ2V**	**S8**
SWP	s6	Swampiness	SWV	**W8**
MOTT	**M2**	Mottling	**MTV**	**M8**
SOLC	s2	Soil Color	SCV	**C8**

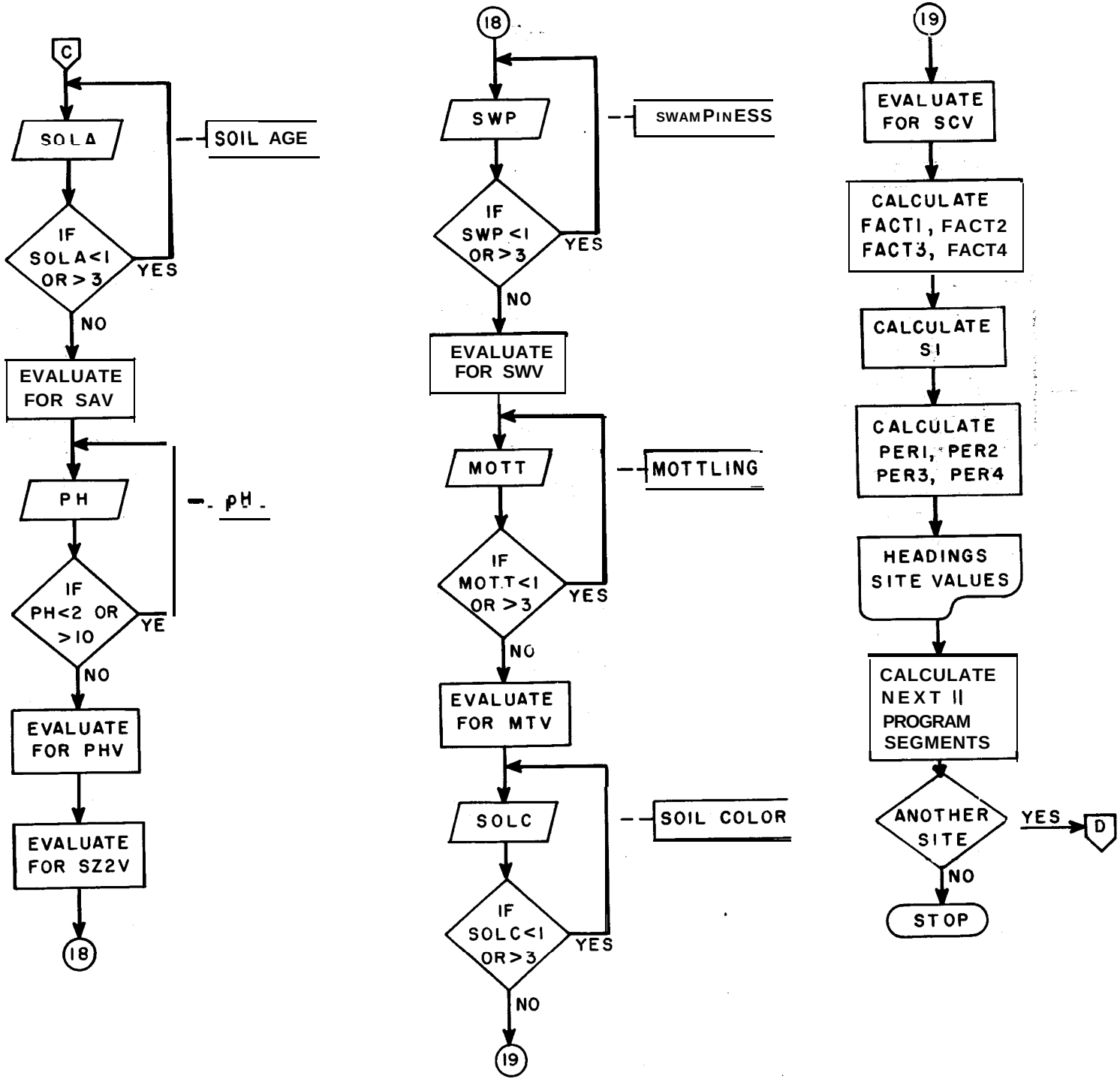
APPENDIX C

Flowchart of the SITEQUAL program




A
PASTI
PRESENT COVER
IF PASTI<1 OR >3
YES
NO
IF PASTI=3
YES
NO
EVALUATE FOR PSIV
5
8
PAST2
YEARS SITE CULTIVATED
SETT IFQ=2
IF PAST2<=2 & PASTI <=1
YES
6
NO
FI
FERTILIZATION
7
7
6
IF PAST2<1 OR > 5
YES
8
NO
EVALUATE FOR PSIV
5
WAT
DEPTH TO WATER TABLE
IF WAT<1 OR>5
YES
NO
EVALUATE FOR WTV & APV
TOPO
TOPOGRAPHIC POSITION
IF TOPO<1 OR>3
YES
9
9
EVALUATE FOR TPV
MICR
MICROSITE
IF MICR<1 OR>3
YES
NO
EVALUATE FOR MSV
IF STR=1
YES
10
NO
EVALUATE FOR SRV
IF STRC=2,3, OR 4
YES
11
NO
EVALUATE FOR TXV
12
B


8
EVALUATE FOR TXV
11
SET VALUE FOR TXV & SRV
10
12
FLD
FLOODING
IF FLD<1 OR>4
YES
NO
EVALUATE FOR FLV
PASTI=3
YES
13
NO
EVALUATE FOR PS2V
14
15
15
EVALUATE FOR PS2V
13
14
GEOS
GEOLOGIC SOURCE
IF GEOS<1 OR>3
YES
NO
EVALUATE FOR GSV
YES
IF PASTI=3
NO
IF PASTI=2 & FQ=1
YES
15
EVALUATE FOR PS3V
16
IF PAST2>=3 & FQ=1
YES
15
NO
17
EVALUATE FOR PS3V
15
SET PS3V
16
ORGM
ORGANIC MATTER
IF ORGM<1 OR>3
YE
NO
EVALUATE FOR OMV
TSOL
DEPTH TOPSOIL
IF TSOL<1 OR>3
YES
NO
EVALUATE FOR TSV
C


C
SOLA
SOIL AGE
IF SOLA<1 OR>3
YES
NO
EVALUATE FOR SAV
PH
pH
IF PH<2 OR >10
YE
NO
EVALUATE FOR PHV
EVALUATE FOR SZ2V
18
18
SWP
SWAMPINESS
IF SWP<1 OR>3
YES
NO
EVALUATE FOR SWV
MOTT
MOTTLING
IF MOTT<1 OR>3
YES
NO
EVALUATE FOR MTV
SOLC
SOIL COLOR
IF SOLC<1 OR>3
YES
NO
19
19
EVALUATE FOR SCV
CALCULATE FACT1, FACT2 FACT3, FACT4
CALCULATE S1
CALCULATE PER1, PER2 PER3, PER4
HEADINGS SITE VALUES
CALCULATE NEXT II PROGRAM SEGMENTS
ANOTHER SITE
YES
D
NO
STOP

METRIC EQUIVALENTS

1 foot = 3.28 meters
1 inch = 2.54 centimeters

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Harrington, Constance A., and Casson, Bettina M. SITEQUAL-A user's guide. Computerized site evaluation for 14 southern hardwood species. Gen. Tech. Rep. SO-62. New Orleans, LA: U.S. Department of Agriculture, Forest Service, Southern Forest Experiment Station; 1986, 13 p.

SITEQUAL, an interactive computer program, evaluates site quality for 14 southern hardwood tree species. This report rapidly evaluates site conditions for all species or determines the relative sensitivity of these species to specific conditions, including past or proposed land use practices.

Additional keywords: Soil-site prediction, site index, site quality, computer programs/programming.